

### **Brad Eggold - Red Flags Analysis**

Red Flags is a joint effort to monitor making progress towards fish community objectives. Information for recommendations exists on a Level 1 / Level 2 scenario (one year trend and 3 of 5 year trend). Brad then presented the data from Lake Michigan predator prey community.

Triggers exist on the distribution of outcomes around a mean. This analysis provides recommendations to the Lake Committee whenever 50% or more of the parameters result in a red flag. 2009 data predicted that the 2010 prey fish levels should increase. We also predicted lower returns of predators based on available prey. Management decisions can be influenced by the salmonid working group through discussion of the data; however decision analysis and stake holder inputs also provide a major component.

Catch rates in the charter industry increased last year while the model we used predicted a decline. We experienced the lowest number of Chinook salmon returning to weirs in 2010. Natural reproduction drives the system. OTC marking and evaluation is estimating that over 50% of the Chinook salmon in Lake Michigan are wild fish, and this has been consistent now for 4 years. There is no direct relationship between number of Chinook stocked and the number caught. Alewife reproduction appears to be increasing. Maturation schedules of Chinook are not clearly understood. Growth indicators are also not changing like they have in the past.

Lake Michigan is changing rapidly. Acoustic survey and trawl survey results point in different directions. 2010 was the 2<sup>nd</sup> biggest year class in the last decade for alewife. The predators are the best prey collection method we can look at, they get fish that we do not in our sampling.

### **Jim Dexter-Structured Decision Making**

This is process that will more fully engage constituents, more so than we have done in the past. This will be an evaluation of risk and uncertainty and it will allow us to discuss and refine management objectives for Lake Michigan. This process is designed to give stakeholders more input as to the overall scope of the decision making process. The process in the past may have given the stakeholders less opportunity to provide input. We are proposing to do this to provide more transparency and opportunities for collaboration. Stakeholders will hopefully build ownership in the process. In the fall select representatives will meet in Indiana on Nov 5 for a full day workshop to learn more about the issues and they will report back on what they have learned.

Lake Michigan Fisheries Forum Meeting

June 2, 2011

Milwaukee, Wisconsin

**Mike Jones-Decision Analysis-Structured Decision Making.**

The right decision to stock in Lake Michigan is no simple matter.

Chinook stocking numbers have ranged over an 8 fold variation over the last 40 years.

There are two reasons to stock –control alewife population to help reduce negative effects on native fishes (predation) and to provide for a sports fishery.

Chinook stocked versus alewife biomass produced a negative relationship in the early days. The data clearly shows no relationship between the number of salmon stocked and alewife biomass. The data also clearly shows that stocking more salmon did not result in catching more salmon. The management tools that we have available, or the levers we have available to pull and manipulate, include stocking, sea lamprey control, and harvest regulations.

All three management tools are “pretty darn blunt instruments”. Natural reproduction has a large influence on the outcome. Decisions are made in a real world using system models. For example, if I do something, make some decision, and then I expect something to happen. Observation models rate the consequences of prior actions. 1). what do we hope to achieve—2) what choices do we have—3) we build systems models as a basis for making predictions about future scenarios that we may choose as management options. However, we need to be very careful about uncertainty. Fishery science is more difficult than rocket science, there is much more uncertainty in what we do because we do not know everything and how the system behaves in its entirety. Our goal for using this structured decision making process is to bring constituents into the decision making process. Assumptions can change the game and change our future management actions.

In 2000 and 2001 we started decision analysis work for Lake Michigan salmon stocking. In 2005 we presented the results of that effort to the LMC. We have been working on updating the modeling and connecting those efforts with the stakeholder process.

Technical work and stakeholder engagement are both very important to the process.

The Forum then engaged in discussions regarding what they wanted from the fishery:

***Management Goals of stocking salmon:***

Maximize Catch rate limit

Maintain Fall / Spring steelhead runs

Provide larger Chinook, 16 to 18 lbs range at age 3+

Maximize early survival

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Maintain stable fishery  
Maintain diverse fishery  
Sufficient forage available for objectives

“Feedback policies” in the model can be very important— we call these triggers and they could be numerous and varied. A trigger we used last time was that if salmon weight dropped to a pre-determined number in the modeling predictions that stocking strategies would be immediately adjusted to account for that change.

We have an incredible data set that is available for over the last 40 years. We feed data into the model and look forward in time. This is both introspective and prospective. Alewife recruitment continues to decline. How good are predators at finding prey? Search rates (how easy or difficult is it for a predator to find prey) appear to be lower than we originally thought. We are faced with the same number of predators that want to eat a declining prey base.

Natural reproduction is influenced by alewife biomass. We have very limited evidence of density dependency issues. When the model is run a whole series of mathematical calculations determine a scenario, or an outcome, of different model run outputs. The models run thousands of times to determine outcomes that are probability based. No matter what possibility you choose there are probabilities of bad outcome. That is undeniable. Feedback policies tend to make more sense and can give us some small amount of control.

Our intention at the November meeting is to present more technical detail and engage the participants in refinement of goals and objectives for Lake Michigan.

Jim Dexter-Lake Michigan and Lake Huron are no longer viewed as one lake for fishery management purposes. Lake Huron is moving forward with stocking discussions this year, a year ahead of Lake Michigan. Please do not read anything into Lake Michigan’s future based on outcomes from the Lake Huron discussions.